

We claim:

1. A method of processing a motion picture having first and second frames, each frame having a plurality of pixels, the method comprising:
  - 5 selecting a first pixel in the first frame having a given color;  
locating a second pixel in the second frame having the given color;  
aligning the first frame and the second frame based upon the locations of the first and second pixels.
- 10 2. The method as defined by claim 1 wherein the first and second frames are aligned in memory.
3. The method as defined by claim 1 wherein aligning comprises aligning the first frame and second frame about the first and second pixels.  
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4. The method as defined by claim 1 further comprising determining the color of the first pixel, wherein the color is determined to be the given color.
5. The method as defined by claim 1 wherein locating comprises determining if the color  
20 of the second pixel is within a given color tolerance.
6. The method as defined by claim 1 wherein the first pixel has a first address, further wherein aligning includes rearranging the second pixel to have an address that equals the first address.  
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7. The method as defined by claim 1 wherein the first frame and the second frame are linearly averaged to provide a third frame.
8. The method as defined by claim 7, wherein the third frame has a higher resolution than  
30 the first or second frame.

- 9       The method as defined by claim 7, wherein the third frame is displayed on a display device.
- 10       The method according to claim 7 wherein the first and second frames are aligned to a  
5 sub-pixel level.
11.     The method according to claim 1 further comprising:  
          selecting a region of the second frame for locating a second pixel having the  
          given color within that region.
- 10       12.     The method according to claim 11, further comprising:  
          if a second pixel is not found within the second frame having the given color,  
          aligning the first frame and the second frame based upon a predetermined formula.
- 15       13.     The method according to claim 12 wherein the predetermined formula is based upon  
past alignments of frames.
14.     A method of processing a motion picture having a plurality of frames, each frame  
having a plurality of pixels, the method comprising:
- 20       selecting an initial frame and a final frame, at least one frame being between the initial  
and final frames;  
          selecting an initial pixel in the initial frame and a final pixel in the final frame, the  
initial pixel having an initial color, the final pixel having a final color;  
          determining an interpolated pixel for each frame between the initial and final frame  
25 based on the initial color and the final color; and  
          aligning the initial frame, final frame, and the at least one frame between the initial and  
final frames, the frames being aligned based upon the locations of the initial pixel, final pixel,  
and each interpolated pixel.
- 30       15.     The method as defined by claim 14 wherein the interpolation is based upon the initial  
color, the final color, and the total number of frames between the initial and final frames.

16. The method as defined by claim 14 further comprising locating the interpolated pixel in a given frame between the initial and final frames.
- 5 17. The method as defined by claim 16 wherein each interpolated pixel has an interpolated color, further wherein the interpolated pixel in the given frame is located based upon the interpolated color of the interpolated pixel.
18. The method as defined by claim 17 wherein locating comprises determining if the  
10 interpolated color is within a given color tolerance.
19. The method as defined by claim 14 wherein the initial frame, final frame, and the at least one frame are aligned in memory.
- 15 20. The method as defined by claim 14 wherein aligning comprises setting the address of the initial pixel, final pixel and interpolated pixel to the same value.
21. The method according to claim 14 further comprising displaying at least the initial frame, final frame, and the at least one frame between the initial and final frames on a display.  
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22. A method for image stabilization of a digital sequence of images, wherein each image has a plurality of pixels and wherein each pixel has an associated address for display and is representative of a color, the method comprising:
- 25 selecting a pixel in the beginning image and a pixel in the ending image;  
interpolating between the colors associated with the selected pixels from the beginning image and the ending image;  
in the step of interpolating determining a color value for each image between the beginning image and the ending image;  
locating within each image a pixel that is within the range of the determined color; and  
30 readdressing each image so that the located pixels are aligned at the same display address.

23. A method for image stabilization of a sequence of temporally displayed digital video images, wherein each image contains a number of pixels and each pixel has an associated display position, the method comprising:
- 5 receiving a signal representative of a color of a pixel in a first image;  
identifying a pixel in a second image having the same color within a predetermined range of colors wherein the range may include a single color; and  
readdressing the second image so that the pixel in the second image resides at the same address as the pixel in the first image.
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24. A method for image stabilization of a sequence of temporally displayed digital video images, wherein each image contains a number of pixels and each pixel has an associated display position, the method comprising:
- interpolating between a color of a pixel in a first image and a color of a pixel in a third image  
15 to determine a searchable color;  
identifying a pixel having a color in a second image within a range of the searchable color; and  
repositioning the images such that the pixels from the first second and third images are aligned.
25. A system for image stabilization of a video sequence having a plurality of video frames,  
20 the system comprising:  
a repositioning module for readdressing a second video image so that a pixel of the second video image having a color within a range of colors of a color of a pixel in the first image is readdressed to the address of the pixel in the first image.
- 25 26. The system according to claim 25, wherein all of the pixels in the second video image are readdressed.
27. The system according to claim 26, wherein the pixels are readdressed in relation to other pixels in the video frame.
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28. A computer program product for use with a computer system, the computer program product containing computer code for processing a motion picture having first and second frames, each frame having a plurality of pixels, the computer code comprising:
- 5 computer code for selecting a first pixel in the first frame having a given color;  
computer code for locating a second pixel in the second frame having the given color;  
computer code for aligning the first frame and the second frame based upon the locations of the first and second pixels.
29. The computer program product according to claim 28 wherein the first and second  
10 frames are aligned in memory.
30. The computer program product as defined by claim 28 wherein the computer code for aligning comprises aligning the first frame and second frame about the first and second pixels.
- 15 31. The computer program product as defined by claim 28 further comprising computer code for determining the color of the first pixel, wherein the color is determined to be the given color.
32. The computer program product as defined by claim 28 wherein the computer code for  
20 locating includes computer code for determining if the color of the second pixel is within a given color tolerance.
33. The computer program product as defined by claim 28 wherein the first pixel has a first address, further wherein the computer code for aligning includes computer code for rearranging  
25 the second pixel to have an address that equals the first address.
34. The computer program product as defined by claim 28 further including computer code to linearly average the first frame and the second frame to provide a third frame.
- 30 35. The computer program product as defined by claim 34, wherein the third frame has a higher resolution than the first or second frame.

36. The computer program product as defined by claim 35, further comprising computer code for displaying the third frame on a display device.
- 5 37. The computer program product according to claim 28 further comprising:  
computer code for selecting a region of the second frame for locating a second pixel having the given color within that region.
38. The computer program product according to claim 37, further comprising:  
10 computer code for aligning the first frame and the second frame based upon a predetermined formula if a second pixel is not found within the second frame having the given color.
39. A computer program product for use on a computer system, the computer program  
15 product having computer readable code thereon for processing a motion picture having a plurality of frames, each frame having a plurality of pixels, the computer code comprising:  
computer code for selecting an initial frame and a final frame, at least one frame being between the initial and final frames;  
computer code for selecting an initial pixel in the initial frame and a final pixel in the  
20 final frame, the initial pixel having an initial color, the final pixel having a final color;  
computer code for determining an interpolated pixel for each frame between the initial and final frame based on the initial color and the final color; and  
computer code for aligning the initial frame, final frame, and the at least one frame between the initial and final frames, the frames being aligned based upon the locations of the  
25 initial pixel, final pixel, and each interpolated pixel.
40. The computer program product as defined by claim 39 wherein the interpolation is based upon the initial color, the final color, and the total number of frames between the initial and final frames.
- 30 41. The computer program product as defined by claim 39 further comprising computer

code for locating the interpolated pixel in a given frame between the initial and final frames.

42. The computer program product as defined by claim 41 wherein each interpolated pixel has an interpolated color, further wherein the interpolated pixel in the given frame is located  
5 based upon the interpolated color of the interpolated pixel.

43. The computer program product as defined by claim 42 wherein the computer code for locating includes computer code for determining if the interpolated color is within a given color tolerance.  
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44. The computer program product as defined by claim 39 including computer code for aligning the initial frame, final frame, and the at least one frame in memory.

45. The computer program product as defined by claim 39 wherein the computer code for aligning includes computer code for setting the address of the initial pixel, final pixel and  
15 interpolated pixel to the same value.

46. The computer program product according to claim 39 further comprising computer code for displaying at least the initial frame, final frame, and the at least one frame between the initial and final frames on a display.  
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47. A computer program product for use with a computer system, the computer program product including computer readable code for image stabilization of a digital sequence of images, wherein each image has a plurality of pixels and wherein each pixel has an associated address for display and is representative of a color, the computer readable code comprising:  
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computer code for selecting a pixel in the beginning image and a pixel in the ending image;

computer code for interpolating between the colors associated with the selected pixels from the beginning image and the ending image;

the computer code for interpolating including computer code for determining a color  
30 value for each image between the beginning image and the ending image;

computer code for locating within each image a pixel that is within the range of the

determined color; and

computer code for readdressing each image so that the located pixels are aligned at the same display address.

- 5 48. A computer program product for use with a computer system, the computer program product including computer readable code for image stabilization of a sequence of temporally displayed digital video images, wherein each image contains a number of pixels and each pixel has an associated display position, the computer readable code comprising:

computer code for receiving a signal representative of a color of a pixel in a first image;

- 10 computer code for identifying a pixel in a second image having the same color within a predetermined range of colors wherein the range may include a single color; and

computer code for readdressing the second image so that the pixel in the second image resides at the same address as the pixel in the first image.

- 15 49. A computer program product for use with a computer system, the computer program product including computer readable code for image stabilization of a sequence of temporally displayed digital video images, wherein each image contains a number of pixels and each pixel has an associated display position, the computer readable code comprising:

- computer code for interpolating between a color of a pixel in a first image and a color  
20 of a pixel in a third image to determine a searchable color;

computer code for identifying a pixel having a color in a second image within a range of the searchable color; and

computer code for repositioning the images such that the pixels from the first second and third images are aligned.

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50. A computer program product for use with a computer system, the computer program product including computer readable code for image stabilization of a video sequence having a plurality of video frames, the computer readable code comprising:

- computer code for readdressing a second video image so that a pixel of the second  
30 video image having a color within a range of colors of a color of a pixel in the first image is readdressed to the address of the pixel in the first image.

51. The computer program product according to claim 50, wherein in the computer code for readdressing, all of the pixels in the second video image are readdressed.

5 52. The computer program product according to claim 51, wherein in the computer code for readdressing, the pixels are readdressed in relation to other pixels in the video frame.

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